Intellectual Internationalism and Global Competition in the Shipbuilding Industry

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Abstract

Right now, the dominant position of South Korean and Japanese companies in global commercial shipbuilding is uncontested. However, the competitiveness of South Korea and Japan in the long run is not secure. South Korean and Japanese shipbuilders' competitive strategies are based on an unmatched ability to continuously improve in terms of cost, delivery, and quality. This has worked in the past and continues to be robust today. However, the sharp focus on productivity has taken attention away from product innovation. In the event that lower-cost foreign competitors achieve high productivity, then South Korean shipbuilders will have more strategic flexibility if they strengthen their ability to innovate on the product side. In this paper, I propose that significant opportunities for pioneering product innovation in shipbuilding do exist, and that intellectual internationalism stimulates the ability to identify and realize these. I introduce a theory in which intellectual internationalism is achieved by stages, illustrated with examples from shipbuilding and elsewhere. Finally, I propose that development of intellectual internationalism could be a key to the continued growth and prosperity of South Korean shipbuilding.

Keywords: shipbuilding industry, industrial competitiveness, strategic management, theories of innovation.

Introduction

A generation ago, books about the Japanese economy featured titles such as *The coming Japanese superstate* (Kahn 1970) and *Japan as number one* (Vogel 1979). It seemed everyone was studying Japanese industrial management. By the late 1980s, Japan was widely predicted to be the future dominator of the world economy. That didn't happen, and nobody is predicting it anymore. Recent books on Japan have titles such as *Can Japan compete?* (Porter et al 2000) and *Japan: The system that soured* (Katz 1998). This has been a sobering reversal.

Japan is experiencing a new kind of economic problem. Its hitherto relentlessly competitive manufacturers are coming under severe pressure from newly industrializing countries elsewhere in Asia, and this is creating an atmosphere of apprehension in Japan. There is a crisis of morale across nearly all Japanese manufacturing industries. A Japanese commentator remarked recently that

'Our manufacturing industry seems to have lost self-confidence despite the fact that the fundamentals of Japan are good; its technology is leading the world, citizens are wealthy, and daily necessities are abundant' (Uenohara 2002).

A standard explanation for the Japanese situation was offered by Katz (1998, p.4):

'The root of the problem is that Japan is still mired in the structures, policies and mental habits that prevailed in the 1950s-60s. What we have come to think of as the "Japanese economic system" was a marvelous system to help a backward Japan catch up to the West. But it turned into a terrible system once Japan had in fact caught up.'

Whether or not this explanation is complete or even correct can be argued. However, it is widely believed by the Japanese themselves and so there is likely to be some truth to it. Note that 'mental habits' are singled out as a first-order problem in Japanese economic competitiveness. In this lecture, we will pursue this 'mental habits' theme by exploring what I call *intellectual internationalism*. One of Japan's key features is a very apparent lack of intellectual internationalism. Shipbuilders project a cosmopolitan image, based on their dealings with shipowners, suppliers, and others worldwide. But this can be quite misleading, as we shall see.

How about the case of South Korea? Many South Korean institutions are similar to those of Japan, having been developed to serve the same goal, i.e. economic growth based on building large-scale export industries through learning from outside models (Amsden 1989). Thus, emergent systemic weaknesses in the Japanese model of shipbuilding competitiveness would, I imagine, be of concern in South Korea.

Operational effectiveness and the productivity dilemma

The South Korean and Japanese shipbuilding industries are direct competitors. In terms of corporate structure, design and production technologies, shipyard facilities and layout, and market strategy, the major South Korean shipbuilders do not differ fundamentally from their Japanese counterparts. They enjoy a decisive edge in current world markets based on their dominance in familiar types of ships such as tankers, large containerships, bulk carriers, LNG carriers, FPSOs, and so on. They are also leading builders of marine diesel engines. In all of these areas, owner's requirements are advancing incrementally and basic technologies are largely mature. This means that operational effectiveness (i.e. performance in terms of cost, delivery, quality) is the key to competitive strength. The yard that can deliver a known product 'cheaper, faster, better' gets the order.

In today's business climate, this is not a problem. The operational effectiveness of the South Korean and Japanese industries is advancing fast enough to meet current competitive threats (Koenig et al 2003). But there is a long run problem developing. Competition based on incremental improvements in cost, quality, and delivery has become so keen that product differentiation and innovation is, by comparison, atrophying. Abernathy (1978), in a seminal analysis of innovativeness problems in the Detroit automobile industry, called this the ***productivity dilemma***. Recently, a research team at Harvard Business School explained how this problem is now weakening Japanese industry:

"The Japanese approach to competing not only eliminates differences between competitors but also undermines the entire industry. Competition gravitates to price, power shifts to the buyer, and homogenization lowers the barriers to entry both in Japan and for me-too Asian rivals... Continuous incremental improvement is not strategy" (Porter et al 2000, p.82).

Can a highly productive shipbuilder break free of this strategic dead-end? If so, then it will have to be done without sacrificing the operational effectiveness that is the key to short-run

survival. I believe that most shipbuilders would agree that the long run challenge, then, is to create and master a two-pronged strategy that demands two types of talent:

(1) Operational effectiveness (productivity; cost-delivery-quality)
(2) Pioneering new, high value added products and markets

In the balance of this paper the focus will be on the second of these.

Pioneering new markets: The role of entrepreneurial users

Let's look at a few examples of significant shipbuilding product innovations during the rise and dominance of the Asian shipbuilding industries, i.e. the last 50 years:

- Supertanker
- Containership
- Pure car carrier
- LNG carrier
- SWATH
- FPSO

Japan was the world's leading shipbuilder during most of this era. Surprisingly, though, none of these innovations originated in that country. Why not? As von Hippel (1988) pointed out, we need to look users as well as designers and builders in order to understand the sources of innovation (or lack thereof).

Users, not manufacturers, instigated the most disruptive shipbuilding innovations of the 20th century. That is, these innovations were originated by shipowners rather than by shipyard design teams or R&D departments. For example, the development of huge oil tankers was a key factor in the rise of Japanese shipbuilding. But the supertanker was originated by an American shipowner, Daniel Ludwig. Ludwig was a lifelong marine industry visionary who conceived and realized a decades-long series of original and profitable big ideas. After World War II, he created an opportunity for himself to take a leadership role in Japanese shipbuilding specifically for the purpose of developing his supertanker concept. In 1951, with the permission of the Japanese Government and the U.S. Occupation authorities, he obtained a lease on a former Imperial Navy Dockyard in Kure, Japan. Ludwig's company, National Bulk Carriers (NBC), operated the yard until 1962, and during that period NBC built a series of ships there, each of which led the world in size for its time. Technologies developed at the NBC shipyard (today's IHI Marine United, Kure Shipyard) were widely disseminated throughout the Japanese industry and played a key role in the rise of Japanese shipbuilding (ASME 1992, Sasaki 1988, Davies 1992).

Consider also the case of the containership. This was invented by another American shipowner, Malcolm McLean. McLean was the son of a farmer and his first independent business was owning and driving a second-hand truck. He got the idea for containerization one day while waiting in line, sitting in his truck, waiting for stevedores to unload his truck and put his cargo on a ship. Many years later, in 1955, he sold his trucking business for a substantial sum and set about inventing container shipping. On April 26, 1956, the world's first containership, a converted tanker called the *Ideal X,* sailed from Port Newark, New Jersey. McLean's company, Sea-Land, was the pioneer of "the greatest advance in packaging since the paper bag" (Economist 2001).

Pioneering new markets: The role of creative, contrarian thinking

In financial markets, strategists known as 'contrarians' exist. Contrarians are those who ignore the trends, and consciously seek out and consider opportunities for doing something completely different, perhaps even in violation of conventional common sense. Needless to say,

this is an extra-risky approach. But when successful, it pays very big dividends. Here, I will mention two recent contrarian ideas that have led to marine product innovation:

1. Develop creative civilian shipping concepts and technologies through military collaboration.
2. Use a ship platform not to drill down into the earth, but to shoot off into space.

Shipping concepts and technologies via military collaboration. When technological ability and ample resources are marshaled to serve a critical national defense need, powerful innovation has been the typical result. Countless landmark innovations created by military R&D have been 'spun off' to create new commercial businesses. Digital computers, the Internet, jet aircraft, and global positioning are some everyday examples.

In the marine field, military innovation is readily apparent today. There are key ship product technologies that have clear dual-use, commercial and civil applicability. One of these is high-speed ships. The high-speed ship is not an innovative or creative idea. Countless organizations worldwide have been working on it for decades. However, there has emerged a naval requirement to get development in this area moving forward. As overseas organizations have substantial expertise that can be brought to bear, significant opportunity for international collaboration among innovative ship designers and shipbuilders has been created. Three competing design teams are now working on ship concepts for the U.S. Navy, and each includes a key international component. One team includes a leading Australian fast ferry builder; the others are working with European partners.

Another example of military-derived technology making its way into commercial shipbuilding is the gas turbine. Gas turbine main propulsion has been used in naval vessels for decades. Recently, the commercial and environmental advantages of gas turbines (compared to diesel engines) have led to their widespread adoption in large cruise ship main propulsion.

Sea Launch. A fascinating example of a new, very risky internationally developed ship concept is the multi-national, multi-technology Sea Launch venture in which Norwegian shipbuilder Kvaerner is a partner (Fig. 1). Sea Launch is a truly contrarian concept. It does the opposite of ocean drilling – instead of boring down into the earth, it rockets spacecraft out into orbit. By launching from sea at a position on the earth's equator, the payload and/or lifespan of telecommunications satellites can be maximized. Sea Launch's system consists of an assembly and command ship plus a semi-submersible launch platform. Commercial enterprises from four nations share ownership and technological expertise in this joint-venture company (Table 1). Together, these companies have expertise in rocketry, satellite payloads, naval architecture, ship operations, aerospace systems integration, and other fields. No single organization in the world understands all of these fields.

Sea Launch's ship construction began in 1995, the first commercial spacecraft launch was accomplished in 1999, the tenth was in September 2003, and the next is set for January.

Table 1: Sea Launch venture partners

Company	Country	Sea Launch ownership, %
Boeing	USA	40
RSC-Energia	Russia	25
Kvaerner	Norway	20
SDO Yuzhnoye/ PO Yuzhmash	Ukraine	15

Source: Boeing 2002, p. 4.

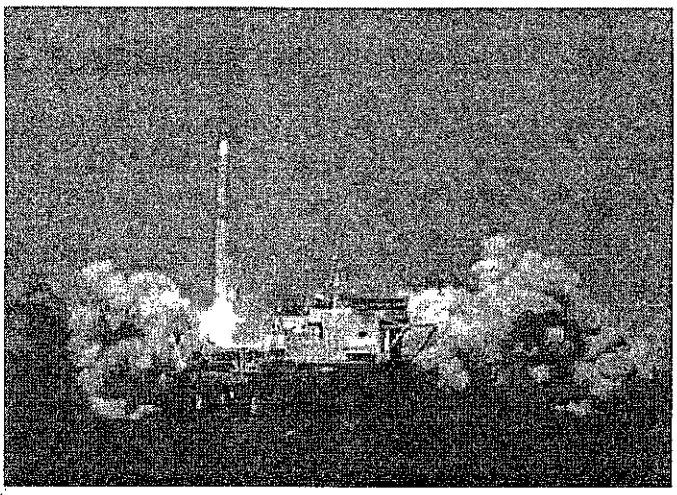

Fig. 1: Sea Launch

Future sources of innovation in naval architecture and shipbuilding

Studying past and contemporary marine innovations can inspire us; some cases have been presented above. What about the future? Future agents of marine industry innovation will be, as before, those capable of envisioning unprecedented but viable and compelling new types of large ships that can do something valuable, that no ship yet does. This requires ability to define a wide range of possible future user requirements, and to subject them to professional judgment regarding how potential future marine capabilities may or may not be able to serve them. How can an organization allocate resources in such a fluid, unstructured intellectual environment? As a hypothesis on how to facilitate this, I propose:

Hypothesis: Competitiveness in the complex world of future ship concepts can be facilitated by direct, first-hand familiarity with the widest possible range of ideas, information, experience, and know-how. This suggests developing intellectual capital, like financial capital, internationally.

Worldwide sourcing of technology, ideas, and leadership is a comparatively new idea and is not often implemented. I will discuss how it has evolved by describing a four-stage theory of intellectual internationalization from the viewpoint of industrial evolution (Table 2).

Table 2: Stages of intellectual internationalization:
An industrial evolution view

1.	Isolation
2.	Export sales
3.	International operations
4.	International society

Stage 1: Isolation. Japan during the Tokugawa era was an example of Stage 1 isolation. More recently, under the rule of Mao in the 1950s and 60s, China isolated itself at Stage 1. In these cases, the national leadership maintained what it regarded as a sufficient level of economic performance while minimizing social, intellectual, and other relationships with outsiders. And in both instances, innovation ground to a halt.

Stage 2: Export sales. Manufacturing for export sales has been a typical first step in internationalism. At this point, selected foreign ideas, practices, and know-how are adopted in a premeditated learning process. South Korean and Japanese concentration on building domestically for global sales, has led to phenomenal success in steel, shipbuilding, automobiles, and other manufacturing industries. In many of these sectors, South Korean and Japanese companies have moved on to the next stage.

Stage 3: International operations. The next step is global operations. The company is not only selling abroad, it is performing many other functions in overseas locations as determined by the needs of global competitiveness. Forces that lead to this stage include overseas market needs, trade restrictions, and opportunities to reduce labor costs. This stage represents a significant increase in the internationalism of the firm's thinking. However, exposure to foreign ideas and concepts is still limited as are the benefits derived therefrom. This is because overseas employees (1) remain low- to mid-grade within the company's management hierarchy, and (2) are mostly employed locally in their own home country; they are seldom promoted to positions of influence at the head office. Because of this lack of career opportunity, Stage 3 companies find it hard to recruit and retain the best and the brightest of international employees.

Stage 3 companies with global operations are exposed to certain types of new ideas and business concepts that originate overseas. But in its heart the company remains domestic. Its core knowledge base and fundamental ways of thinking remain domestic.

Stage 4: International society. Today, there are companies and institutions that have attained the next level of internationalization: Actually *being* international in their society. Rather than restricting themselves to domestic sourcing of people and ideas, these companies attract top individuals globally. College graduates, researchers, strategic thinkers, CEO's... all reflect a global talent pool. The best people worldwide are attracted by career advancement opportunities that are not limited by their origin. Stage 4 companies are well aware of the benefits of intellectual diversity, and have consciously worked to achieve it.

Let's look at some examples of Stage 4 international societies: major league baseball teams, Nissan Motor, Silicon Valley, and universities.

Major League baseball teams are Stage 4 companies. They are based in the United States and Canada but the players come from a variety of nations. The team managers want their team to practice good sportsmanship and to win. To further those ends, they recruit and develop anyone they can find who has enough talent and drive, regardless of nationality. In this way, major league baseball teams securely hold their position as not just the most competitive in North America, but the most competitive in the world.

Japanese automaker Nissan has been compelled to become a Stage 4 international society. By the late 1990s, Nissan had nearly failed, with billions of dollars in debt that could not be serviced given the company's dwindling market share and sagging cost effectiveness (Economist 1998). By now, Nissan's turnaround story, led by Carlos Ghosn, is well known. Ghosn is a Brazilian-born Frenchman of Lebanese ancestry. Despite his very evident non-Japanese origin, a recent poll placed Ghosn at the #2 rank (after Fujio Mitarai of Canon) as the business leader most respected by Japanese executives (Nikkei Business Daily 2003). Ghosn is also a popular figure among the Japanese people. In a fairly casual recent search, I located 12 Japanese books on his life and management style.

Silicon Valley (California) is perhaps the most intellectually international society in the world. Talented individuals from the entire globe thrive here. At least one third of Silicon

Valley's scientists and engineers are immigrant Americans. Many of these individuals are technological and entrepreneurial leaders. Immigrants from China and India have, since 1980, founded 2,700 new start-up companies which employ 58,000 people and have combined annual sales totaling to 17 percent of all high-tech sales in the region (Zachary 2003, p. 65).

Universities were perhaps the original Stage 4 organizations. Intellectual internationalism has been a standard feature of Western universities since their origination in medieval Europe, when Latin was the international language of Western scholars. The very name 'university' implies this. Today, this tradition continues, with faculty members at leading universities reflecting a wide-ranging diversity of intellectual backgrounds.

Implications? South Korean and Japanese shipbuilding companies remain for the most part at Stage 2, with domestic operations building competitively for export sales. There are exceptions. Kawasaki, for example, has a 50/50 joint-venture shipyard in China that builds VLCCs and other types of vessels (Nikkei Weekly 2003). That company has thus entered Stage 3 global operations.

To date, few firms anywhere have reached Stage 4. But this deficiency is particularly apparent in Japan. There, many leading companies are staffed by intellectually homogeneous people, from very similar educational backgrounds, reading the same newspapers and journals, and following predictable career paths Lack of intellectual cross-pollination renders many Japanese companies incapable of leading strategic innovation. As Porter and his Japanese colleagues put it,

"...Japanese executives often rely on the same sources of information about markets and industries...the result is that executives from different companies often share the same view of the future and will therefore pursue similar actions." (Porter et al 2000, p.164).

Conclusion

Because of the threat of entry on the part of up-and-coming industrializing nations, shipbuilding competitiveness in high-cost countries is likely to require a two-pronged strategy consisting of (1) maintaining short run competitiveness through highly efficient design and production operations based on skillful management and advanced technologies, and (2) securing long run competitiveness by developing talent at pioneering new product concepts and markets.

South Korean shipbuilders (and their Japanese counterparts) lead the way in the first of these points, i.e. in operational effectiveness. Their ability to deliver a cost effective, high quality product is second to none. Equally importantly, productivity continues to improve rapidly (Koenig et al 2003) so the immediate competitive outlook is not unfavorable as South Korean design and production processes present a 'moving target' to catch-up countries.

As there appears to be no short-term competitive crisis, now would be an opportune time to undertake a strategic self-examination. Increased emphasis on product innovation and identification and exploitation of new high-tech markets could aid South Korea's leading shipbuilders in avoiding unhealthy dependence on cost-based competition, which if left unchecked will ultimately sap the morale of the industry as is the case today in Japan.

Where will this innovative drive come from? Given the global complexities of the marine industry, I suggest that groups of people of very similar backgrounds, attitudes, and connections will be at a disadvantage in trying to build unconventional but viable concepts from among the wide range of possible global opportunities. Success is more likely to accrue to groups which value and foster intellectual diversity, contention, and adventurism. I believe that South Korea has excellent potential to be at Asia's forefront in this evolution.

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